Geographic Review Panel 3 – American River/Eastside Tribs

Proposal number: 2001-K202 **Short Proposal Title:** Delta Rearing by Central Valley Chinook Salmon

1. Applicability to CALFED ERP Goals and Implementation Plan and CVPIA priorities, and relevance to ERP and CVPIA priorities for your region. Very high. The importance of delta rearing is perhaps the single most important issue for management of chinook salmon in this region.

2. Linkages/coordination with previously funded projects or other restoration activities in your region. The study is linked to pilot efforts by DFG and the IEP. It does have a direct connection with restoration projects in this region, however such a connection is not essential for a system-wide research study.

3. Feasibility, especially the project's ability to move forward in a timely and successful manner. Otolith microstructure analysis is a well established technique that could provide very important information, but it is doubtful that it can provide all of the information that the proposal promises to deliver. We agree with many of the concerns from the independent technical reviewers and TARP. Questions about the ability of the proposed methods to differentiate stocks and tributaries are a major concern. As such, it may be premature to initiate a study of this scale until some of the basic methods are resolved.

4. Qualifications of the applicants and others involved in implementing the proposed project. The applicants appear qualified to undertake this study. Dr. Titus has a good deal of experience with otolith analysis. However, he seems to have a great deal of difficulty getting his work reported, even in the gray literature.

5. Local involvement (including environmental compliance). Permitting does not seem to be an issue for this study.

6. Cost. The cost of this study is competitive given that it is a 3-year effort. It is possible that the project may be somewhat under-budgeted.

7. Cost sharing. DFG contributions represent a substantial cost-share.

8. Additional comments. We agree with the Reviewer's concern that the experimental design may be conceptually flawed. While it may be possible to determine the proportion of "successful" adults that originated from the Delta versus tributaries, this information may be difficult to apply without information about the relative number of juveniles that originated from each location. A related concern is that floodplain effects may confound interpretation of otoliths from upstream or Delta locations. As stated by the Applicants, otolith differences may be largely determined by food availability and water temperature. Studies on the Yolo Bypass and Cosumnes River indicate that there are marked differences between river and floodplain habitats. Both habitat types occur in the upstream and Delta locations—as a result, otolith patterns may be affected more by lateral distribution (river vs. floodplain) than longitudinal distribution (tributaries vs. Delta).

Science is a social enterprise, of which publication is a critical part. Half a million dollars is a substantial research grant by any standard, and CALFED should expect such a grant to result in peer-reviewed publications.

Regional Ranking

Panel Ranking: Medium

Provide a brief explanation of your ranking: Delta rearing is an exceptionally important issue for CALFED and CVPIA. Analyses of otolith microstructure could answer questions of major practical importance to CALFED and the CVPIA. That said, the other reviewers have expressed valid concerns. The proposal is not well written and promises more than it can deliver. As other reviewers have pointed out, it is not obvious how different natal streams could be distinguished by otolith microstructure (even otolith isotopic composition will not do this unless fish rear for a considerable period in their natal stream (Ingram and Weber 1999, Geology 27:851-854)). Similarly, it is not clear how fry that rear in the Delta would be distinguished from fry that rear in the Yolo or Sutter bypasses by otolith microstructure (Kathy Hill of DFG has unpublished data showing that fry from Butte Creek grow rapidly in the Sutter Bypass). It may be that the investigators have preliminary results from their IEP and CALFED-funded work to support their claims, but they do not present any.

It would be worth the money simply to know what proportion of returning salmon reared in a place where they could grow rapidly as fry, but this is not what is proposed. Similarly, it could be worth the money simply to have the synoptic collection of otoliths from juveniles at over 20 locations in the system, particularly if there were guarantees that other investigators could have access to them. Unfortunately, the applicants have a poor reputation for collegiality. Therefore, if the proposal is funded, CALFED should require a written guarantee that the otolith collection and data be made reasonably available to others.

This proposal would be significantly improved by more realistic objectives, or by preliminary data or citations showing that the stated objectives are in fact realistic. The applicants have the ability and at least partial funding from CVPIA and IEP to obtain preliminary data, so it is reasonable to expect such data to be presented in a proposal for additional funding. More specifically, the proposal should include figures showing otoliths of fish that have reared in at least representative examples of the different environments that the proposed project intends to distinguish, and explaining how they can be distinguished. A revised proposal should include better justification of the budget. The qualifications of the applicants would be substantially improved by publication of recent otolith work in the peer-reviewed literature.

The proposal could also be improved by using a Bayesian approach. In such an approach, instead of using straw-man hypotheses (Salmon that survive to adulthood do not use the Delta for rearing; salmon that survive to adulthood do not use their natal tributary for rearing), the hypotheses would be different values for the proportions of surviving adults that used each habitat (See Hilborn and Mangel (1997) The Ecological Detective for an introduction to the Bayesian approach).